

Ser.no. 10/660,708
Amendment dated August 17, 2005
In Reply to Office Action dated February 18, 2005

Amendments to the Drawings

The attached sheet of drawings includes changes to Fig. 3. The sheet, which includes Fig. 3 only, replaces the original sheet including Fig. 3 only.

Attachments: Replacement sheet (1)
Annotated marked-up drawing (1)

Note: any replacement sheet must be identified in the top margin as "Replacement Sheet". Any marked-up annotated sheet showing changes must be labeled "Annotated Marked-up Drawings", and must accompany the replacement sheet in the amendment, e.g. as an appendix.

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REMARKS / ARGUMENTS

In the specification:

1. The Examiner called for correction of "Furth r" to "Further" on page 8. However, in Applicant's paper and electronic copies, no such error was found. The Examiner is requested to identify which paragraph and line number specifically, and/or to enter the correction by hand.
2. The title has been changed, primarily to distinguish the invention from other applications filed by the inventor/applicant.
3. A replacement Abstract of the Disclosure is provided, to more accurately reflect aspects of the invention.

Claims 1-10 have been cancelled. Claims 11-30 have been added.

Fig. 3 has been replaced. The only differences are with respect to labeling, for greater clarity. Specifically, the motor end and pump ends of the motor cylinder 202' and pump cylinder 201' have been indicated in replacement Fig. 3.

Claim 1 was rejected under the judicially created doctrine of obviousness-type double patenting, over claim 1 of the inventor's prior patent no. 6,443,196. Applicant has cancelled claim 1, and there is no new claim of corresponding scope; instead of "means for providing reach" in cancelled claim 1, applicant's broad claims now recite various pump means to accomplish reach. Accordingly it is submitted that there is no need for any terminal disclaimer.

Claims 6, 8 and 10 were rejected as failing to comply with the enablement requirement, on the basis that "the specification does not provide details for how the circuit includes a float valve whereby 'the load' (i.e. what load?) is supported". However, it is submitted that the "float" aspect is clearly described in the specification in paragraphs 0039 -0046. Reference to a "float valve" is perhaps misleading, in that it does not mean a valve operated by a float (as in a toilet tank, for example), but in this context instead means a valve which provides a "float" capability. As

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explained in paragraph 0039, this means that the weight of the boom, etc. is supported, but it is relatively free to "float" horizontally, i.e. for extension or retracting. "Relatively free" means that essentially no large force is required to move the boom horizontally, though obviously some force is required to overcome inertia and friction (both mechanical and hydraulic). The expression "relatively free" has not been used in the new claims in any event.

In response to this rejection, Applicant has improved the language of the relevant dependent claims in any event (new claims 23-25), by specifying a valve which allows the pump to be bypassed, so that hydraulic fluid is free to flow between the respective working ends of the cylinders, instead of that flow (and resulting "reach" of the boom) being controlled by operation of the pump. The explanatory wording relating to the boom being relatively free in terms of reach motion is superfluous, and has been omitted from the new claims. The new claims also avoid the need for the words "the load" which previously lacked an antecedent, and for the words "the engine" in former claim 9.

Turning to the more substantive grounds for rejection, claims 1-5, 7 and 9 were rejected as anticipated by commonly-owned U.S. patent no. 6,763,863 (Liu). This is no new claim corresponding to former claim 1, but new claim 11 corresponds to former claim 2, and new claim 26 corresponds to former claim 9, both of which were rejected on these anticipation grounds. Applicant is therefore responding to the rejection, referring to the language of new claims 11 and 28.

The key element of new claim 11 is the "means for producing reach, comprising pump means connected to control said transfer of hydraulic oil between said working ends". The pump means may be "a reversible flow pump connected between said working ends" (reference no. 201; new claim 12; see paragraphs 0030-0035 and Figs. 2-4, *inter alia*) or "an engine-driven variable displacement reversible flow pump connected between said working ends" (new claim 13; see paragraphs 0036-0037 and Fig. 5, *inter alia*). Contrary to the Examiner's assertion, the cited Liu patent does not show any such pump arrangement. The pumps in Liu (30 and 32, not 30 and 31 as stated by the Examiner), are simply for supplying fluid to the hoist cylinder 10 and stick cylinder 11 respectively. Fluid is essentially free to shunt between working ends of the cylinders,

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i.e. there would be a "float" situation, but for the necessary use of a reach cylinder to prevent floating, i.e. to control reach. In the present invention, by contrast, there is no free flow of fluid between the working ends. Instead, the flow of fluid is regulated by the pump means. This eliminates the need for a reach cylinder to control reaching, reach control instead now being provided by using the pump means to control flow between the working ends. This is explained further, in considerable detail, in the present specification in paragraphs 0008-0010 and 0030-0035.

The use of a pump to control reach in this manner is neither taught nor suggested by any of the cited prior art, nor any other prior art known to the Applicant.

For the same reasons, it is submitted that the Liu patent is also not applicable to new claim 26 (corresponding to former claim 9), which recites two engine-driven computer-controlled reversible flow pumps connected to supply or remove oil in coordinated fashion from working ends of the cylinders. As explained in the preceding, the pumps in Liu are completely different, and furthermore they are open loop pumps which do not allow any energy recovery through them.

Dependent claims 14-16 have been added to recite the use of an engine-driven pump to operate the hoist cylinder (see paragraph 0037 and Fig. 6 for support).


Finally, new claims 27-30 have been added. These are very similar to new claims 11-14, but relate to the Fig. 4 embodiment where reach is effected using the non-working ends of the cylinders rather than the working ends (whether it is the base end or the rod end which is the working end). As discussed in paragraph 0035 of the description, this configuration subjects the pump components to less hydraulic pressure than when connected to the working end (normally the base end).

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In view of the above, it is respectfully submitted that the application is now in condition for allowance, which is requested.

Respectfully submitted,

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***Appendix to Amendment dated July 18, 2005
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Replacement Abstract of the Disclosure

ABSTRACT OF THE DISCLOSURE

The knuckle boom includes a hoist boom having a proximal end pivoted to a machine base, and a stick boom having a proximal end pivoted to a distal end of the hoist boom. At least one hydraulic hoist cylinder is mounted between the machine base and the hoist boom, and at least one hydraulic stick cylinder is mounted between the hoist boom and the stick boom. A hydraulic circuit supplies hydraulic oil to the cylinders, and provides an oil flow path between working ends of the cylinders so as to transfer a slug of pressurized hydraulic oil between the working ends. Reach actuation is by use of any suitable pump arrangement, where the pump controls the transfer of the slug, with no need for a separate reach actuation cylinder or other means to prevent the boom from just floating. Advantage include that lugging and space for a reach cylinder are not needed on the boom, and that lifting and lowering hydraulic losses for the knuckle boom are low.

Annotated marked-up drawing - ser.no. 10/660,708

